SECTION 2.3.6

BIG RIVER WATERSHED

Based on the recognition that the anadromous fishery is in decline, activities to assess the watershed and improve conditions for anadromous salmonids are underway. Sediment and high water temperatures impair the Big River. A technical TMDL has been completed for sediment but not for temperature. The following provides an overview of activities and outlines our basic framework and strategy at this time.

WATERSHED DESCRIPTION

The Big River watershed drains an area of approximately 116,000 acres, or about 181 square miles. The Big River estuary is located immediately south of the town of Mendocino and approximately ten miles south of Fort Bragg. The hydrological unit for the Big River is 1113.30 (CalWater version 2.2). The watershed drains from the east to the west, sharing ridges with the Noyo River watershed to the north, the Eel River watershed to the east, and the Little, Albion and Navarro Rivers watersheds to the south. The Big River watershed has a Mediterranean climate, characterized by a pattern of low-intensity rainfall in the winter and cool, dry summers with coastal fog. Mean annual precipitation is 40 inches at Fort Bragg near the western margin of the watershed and 51 inches at Willits to the east. About 90% of the precipitation in this area occurs between October and April with the highest average precipitation in January. Snowfall is very rare and hydrologically insignificant.

The Big River Basin is sparsely populated, with most of the land used for silviculture and other smaller areas used for ranching. There are only a handful of populated areas within the Big River Basin, including the areas around Orrs Springs, Whiskey Springs, Cameron, and Mendocino. By far the largest populated area is Mendocino, with a population of approximately 824 people.

Vegetation in the Big River basin is predominantly coniferous with redwoods near the coast and in the stream bottoms and Douglas fir in the interior and along the ridges. Broadleaf trees typical of the area include tan oak, live oak, alder, bay and madrone. They are interspersed throughout the conifer stands. On the drier slopes in the headwaters there is considerable oak-grassland and brush. California black oak, Oregon oak, ceanothus, currant, raspberry, and manzanita comprise woody species dominant in these areas. Herbaceous species consist of oat grasses, bromes, fescues, and filagree.

The Big River is designated a Critical Coastal Area. See Appendix C for more information on this Critical Coastal Area.

Historically, coho salmon *(Oncorhynchus kisutch*) and steelhead trout (*O. my*kiss) utilized habitat throughout the Big River watershed, and are still present today. All of the subwatersheds in the Big River watershed have accessible streams presumed to have been historically fully suitable for sustaining populations of salmonids under pre-management conditions. Compared to coho, currently steelhead are reported to be relatively more abundant and more widespread in the Big River watershed, but the actual population numbers are low for both species, especially as compared to historic levels. Chinook salmon (*O. tshawytscha*) have also been found in the Big River Watershed, although little is know about the population size or extent of the species.

The primary beneficial uses of concern in the Big River watershed are those uses associated with the cold freshwater fishery that supports coho salmon, chinock salmon, and steelhead trout, which are listed as threatened under the federal Endangered Species Act. Additionally, the Basin Plan identifies municipal, industrial, agricultural, and recreational uses of the Big River watershed. The beneficial uses of water related to rare, the Regional Water Board and State Water Board have approved threatened or endangered species for this basin. As with many of the north coast watersheds, the beneficial uses associated with coldwater fishery appears to be the most sensitive of the beneficial uses in the watershed because of the sensitivity of salmonid species to habitat changes and water quality degradation. Accordingly, protection of these beneficial uses is presumed to protect any of the other beneficial uses that might also be harmed by sedimentation and high water temperatures.

The following beneficial uses are related to the Big River watershed's coldwater fishery:

- Commercial and sport fishing (COMM);
- Cold freshwater habitat (COLD);
- Migration of aquatic organisms (MIGR);
- Spawning, reproduction, and early development (SPWN); and,
- Estuarine habitat (EST).

The five largest property owners are private timber companies and a state-owned forest: together, Mendocino Redwood Company, Jackson State Demonstration Forest, Pioneer Resources, Hawthorne Timber Company (managed by Campbell Timberland Management),

and Weger Holdings own 83 percent of the watershed. Thirty-one property owners (ownership from 160 to 3,760 acres) own another 14 percent of the land, and the rest is in scattered private residences. Timber production and harvest are the primary land uses in the watershed. The history of the Big River watershed is dominated by timber harvest. Logging began in the basin about 1852. A mill was built, railroads were constructed and splash dams were used to transport logs down the river to the mill. Tractor yarding and road watershed has been logged, some areas more than once. There is some grazing along Comptche-Ukiah Road and in the southeast portion of watershed.

In 2002, the majority of the Big River Estuary, as well as upland areas, were added to Mendocino Headland State Park. The Big River Unit consists of 7,334 acres, which, when added to the surrounding State Park system, created a 74,000-acre wildlife corridor which links diverse coastal and inland habitats into the largest piece of connected public land entirely within Mendocino County. Reaching from the river's mouth to 800-foot elevation inland ridges, the Big River wetlands property includes a wide range of habitats including 12 miles of salmoind spawning gravel, and over 1,500 acres of California's remaining wetlands. The land was purchased with private funds through the Mendocino Land Trust.

ASSESSMENT AND PROBLEM IDENTIFICATION

The Big River watershed provides degraded conditions for salmonids because of poor quality summer rearing and overwintering habitat, which is limited by high sedimentation, low large woody debris (LWD), a low number of pools, the shallow depth of pools, channel entrenchment and a lack of connection to off-channel habitat. Spawning gravels generally are present, but their quality is low due to embeddedness of the gravels and fine sediment in the substrate. High water temperatures also impair salmonid rearing, in part due to low canopy cover

There is limited information from which to estimate the historic population size of salmon and steelhead in the Big River Watershed. In the early 1960s, the California Department of Fish and Game (CDFG 1965) estimated that 6,000 coho and 12,000 steelhead spawners returned each year to the Big River Watershed. At that time, CDFG also noted that the watershed was not supporting larger runs of fish and cited erosion and siltation as limiting factors. Thirty years later, Brown et al. (1994) estimated coho spawning populations to be around 280 fish in the entire Big River Watershed. The populations of both coho and steelhead have substantially decreased and will continue to decline without protection and restoration.

Within the Central California Coast Evolutionary Significant Unit (ESU), coho salmon abundance in the 1990's was clearly lower than in the mid-to-late 1980's (SFSC 2001). Big River Watershed coho populations are located within the Central California Coast ESU. According to the Southwest Fisheries Science Center operated by the National Marine Fisheries Service, coho within the Central California Coast ESU are presently in danger of extinction (SFSC 2001). However, according to the *Status Review of California Coho Salmon North of San Francisco* (CDFG 2002b), "coho salmon populations of streams in the northern portion of the [Central California Coast] ESU seem to be relatively stable or are not declining as rapidly as those streams to the south."

Excessive inputs of sediment to the Big River and its tributaries have caused a reduction in the quality and quantity of instream habitat that is capable of fully supporting many of the beneficial uses of the Big River. In addition, there are specific concerns about sedimentation on the estuarine processes in the Big River because timber harvesting within the valley has

increased erosion on the slopes above the river. Subsequently, the sediment load of the river has increased. Estuaries are subject to natural sedimentation with the coarser particles settling out upriver and the finer particles settling out in the estuary and floodplains along the lower reaches of the estuary. Sedimentation greatly accelerated after logging began, resulting in a major decrease in width and rapid sediment build-up along the banks in the lower river. The narrowing channel caused an increase in water velocity and increased deposition of fine sediment on the floodplains in the tidal areas. Levees built up at the edges of wetland flats where they adjoin the main channel are primary indicators of this rapid sediment accretion. These levees extend at least 3 kilometers (2 miles) further down the estuary than they did 80 years ago. There is concern about the effect of excessive sedimentation in the estuary on vegetation because sediment-driven levee formation has cut off tidewater intrusion in and around the estuarine sloughs. The productivity of the estuary relies heavily on the production of salt marshes.

Sediment delivery to the river and tributaries has varied over time with the most delivery in the early periods of timber harvest when logging practices accounted for most of the sediment generation. But in recent times, since 1989, even though harvesting has increased (over 55 percent of the watershed has been harvested in the last two decades) and the quantity of roads has increased (over a third of the roads have been constructed in the last decade) total sediment generation did not increase over historical levels possibly due to improved road building and timber harvest practices. However, road related sediment delivery has increased in total and proportionally to the total sediment generated, with 181 tons/sq. mile/year of sediment generated from roads including associated landslides. There is currently an estimated 1,242 miles of roads in the Big River watershed, which translates to a basin-wide road density of 6.86 miles/sq.mile. For more information on sediment sources in the Big River Watershed, please see the Sediment TMDL at http://www.epa.gov/region09/water/tmdl/big/bigfinaltmdl.pdf

Primary water quality issues in the Big River watershed

- Sedimentation of streams
- Salmonid habitat degradation
- High water temperatures

In 2003, as part of the 2002 Clean Water Act 303(d) List update, the Big River was listed as temperature impaired because high water temperatures were found to be negatively impacting salmonids. Although the technical TMDL has not yet been completed, potential sources of the high water temperatures include stream bank modification/destabilization, the removal of riparian vegetation, habitat modification, and non-point sources.

Other issues of concern in the watershed are potential herbicide runoff due to timberland management, livestock entry into watercourses, an inactive rock quarry adjacent to the estuary, a permitted septic disposal facility adjacent to Lagoon Creek, a landfill near Casper, a small mill still in operation on Chamberlain Creek near the men's conservation camp, and the City of Mendocino that is sewered with an ocean outfall. There are some leaking underground fuel storage tank sites in the town of Mendocino and in the watershed itself. There is at least one incident of a fuel spill on Highway 20 into James Creek (a Big River tributary) that continues to contaminate James Creek.

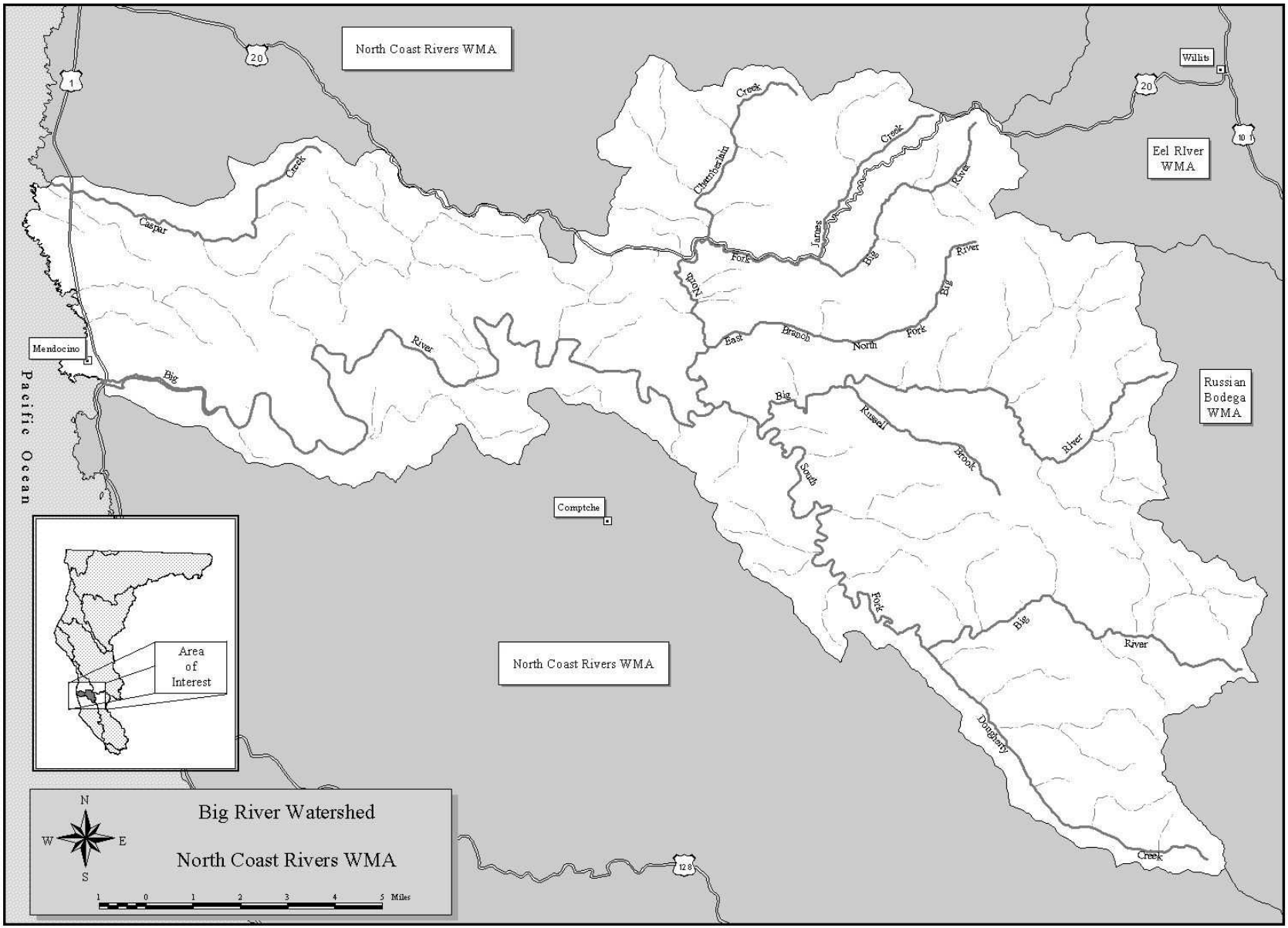

Figure 2.3.6.1. Big River Watershed

WATER QUALITY GOALS

The following listing represents a first-cut delineation of goals and actions to achieve the goals that will be refined through the TMDL development

- **Protect surface and ground water IND, MUN, DOM, REC-1, and REC-2 uses**
- **Protect and enhance beneficial uses associated with anadromous fishes COLD, MIGR, SPWN, EST, COMM**

The overall emphasis in the Big River watershed was the completion of the TMDL Implementation Policy Statement for Sediment Impaired Waters. The increased assessment of timber harvest related activities continues to be a high priority, along with outreach to ranches, rural landowners, and others stakeholders in the Big River. Additionally, the temperature TMDL will need to be developed.

IMPLEMENTATION STRATEGY

Implementation will occur in the form of the TMDL Implementation Policy Statement for Sediment Impaired Waters that was approved by the Regional Water Board on November 29, 2004. The Policy Statement will bring the watershed into a desired future condition that is consistent with the enhancement and maintenance of salmonid species. A broad interagency effort was used to gather and assess existing information on the watershed. Likewise, sediment waste discharge control efforts will continue to incorporate significant interagency and public coordination.

Implementation measures to address the temperature impairment will be developed following completion of the temperature TMDL.

Other concerns in the watershed will continue to be addressed through existing programs. Given current funding constraints, any new and/or redirected resources should be focused on staffing for field nonpoint source compliance, education and outreach efforts, monitoring, and enforcement inspections.

Assessment and Monitoring

Assessment of existing information was used in the development of the sediment TMDL strategy, drawing from existing information contained in plans developed by the CDF and private timber companies as well as any citizen information that was made available. Data and a limited analysis are available in the KRIS-Big River computerized database package. See http://www.krisweb.com/. A watershed assessment of the Big River was to be drafted in a multi-agency effort led by the California Resources Agency called the North Coast Watershed Assessment Program (NCWAP). In total, five state agencies participated in NCWAP: Department of Fish and Game (DFG), Department of Forestry and Fire Protection (CDF), Department of Conservation-Division of Mines and Geology (DMG), Regional Water Quality Control Board – North Coast Region (NCRWQCB), and Department of Water Resources (DWR). The principal goal of NCWAP was to compile and develop baseline scientific information about existing biophysical conditions in north coast watersheds. Unfortunately, NCWAP funding was eliminated before the Big River assessment was completed.

In-stream water quality and hillslope monitoring in the long term will be associated with determining the effectiveness of management practices to reduce erosion and sedimentation and determining trends towards the desired future in-stream condition. Three stations were monitored for basic water quality parameters as part of the Surface

Water Ambient Monitoring Program (SWAMP) in fiscal year 2000-2001. Presently, there are no plans to continue monitoring at these sites.

As part of the Sediment TMDL Implementation Policy Statement for Sediment Impaired Waters, the Regional Water Board directed staff to develop a sediment TMDL implementation monitoring strategy by December 31, 2005. The strategy will provide feedback on the recovery of sediment-impaired water bodies, including the Big River. The monitoring strategy shall include a description of monitoring objectives, trend monitoring stations, the sediment-related parameters that will be monitored, benchmark conditions, measurable milestones, and specific due dates for monitoring and data analysis. Monitoring will likely begin in 2006 following the completion of the monitoring strategy. Although the monitoring strategy is focused on all sediment impaired water bodies in the North Coast Region, the Big River is an excellent candidate for a long term sediment monitoring station due to the presence of the Big River Unit of the Mendocino Headlands State Park and other landowners willing to cooperate and assist with monitoring efforts.

Education and Outreach
As part of the Sediment TMDL Implementation Policy Statement for Sediment Impaired Waters, the Regional Water Board directed staff to conduct public outreach and education on sediment control issues, and to seek additional staff resources for such activities. Staff is currently developing a guidance document on sediment waste discharge control that will include examples of sediment waste discharge sites, sediment control practices, and road management practices; guidance for developing inventories of sediment sources and for developing erosion control plans; sediment assessment methods; suggested prioritization criteria; and monitoring guidance. This guidance document is to be completed by December 31, 2005.

Additional education and outreach will occur during the development of the temperature TMDL for the Big River Watershed.

Coordination
The Regional Water Board currently coordinates with local and State agencies on an as-needed basis. Improved coordination is sought as part of the TMDL implementation process. Additionally, staff is currently serving an advisory role in the development of an interim management plan for the Big River Unit in cooperation with California State Parks.

Core Regulatory
The current level of point source regulation (inspection, monitoring, and enforcement) on traditional dischargers with some increase in storm water issues is anticipated. Construction related problems are addressed through the core regulatory program and the local oversight of individual systems.

Ground water
Ground water issues center around petroleum contamination and mill sites and will continue to receive the current level of activity. Groundwater and surface water contamination is suspected at former and existing mill sites that historically used wood treatment chemicals. Discharges of pentachlorophenol, polychlorodibenzodioxins, and polychlorodibenzofurans likely occurred with poor containment typically used in historical wood treatment applications. These discharges persist in the environment and

accumulate in surface water sediments and the food chain. Additional investigation, sampling and monitoring, and enforcement actions are warranted, but insufficient resources exist to address this historical toxic chemical problem.

Nonpoint Source

Continued involvement in forestry, grazing and county road issues is necessary to ensure protection of aquatic resources. The listing of coho salmon as threatened under the federal Endangered Species Act has put the spotlight on all land use activities that potentially may increase sedimentation or otherwise affect habitat. The TMDL implementation process will increase work with local agencies and groups regarding land use effects on water quality, following the State Nonpoint Source Enforcement Policy (see Appendix B) to reduce nonpoint source pollution. An outreach program will enhance the effectiveness of the program. Where land management activities are found to be out of compliance with Basin Plan standards, Regional Water Board staff investigation and enforcement actions are necessary. Regional Water Board staff will participate on the Regional Committee to develop a Critical Coastal Area Action Plan and implement projects in the Big River Critical Coastal Area.

Timber Harvest

The Regional Water Board has an extensive timber harvest program where staff review and inspect timber harvest plans on private lands for implementation of the Forest Practice Rules and compliance with recently adopted General Waste Discharge Requirements (WDRs) or a Categorical Waiver. Additionally, staff reviews U.S. Forest Service timber sales for implementation of best management practices and compliance with a recently adopted Categorical Waiver to ensure protection of water quality and beneficial uses.

Regional Water Board staff continues to work in concert with the California Department of Forestry and Fire Protection during the review and approval of proposed timber harvesting activities on private lands. The SWRCB and CDF/BOF entered into a Management Agency Agreement, which delegates some water quality protection responsibilities to the CDF/BOF associated with timber harvest regulation. The Regional Water Board has not given up any authority to regulate timber if violations of the Basin Plan occur or threaten to occur. More recently however, the Regional Water Board adopted General WDRs and a Categorical Waiver of WDRs for discharges related to timber harvesting on private timberlands. Regional Water Board staff continues to review timber harvest plans (THPs) and non-industrial timber management plans (NTMPs) and provide recommendations to CDF during the Review Team process. In addition, Regional Water Board staff must review THPs and NTMPs for compliance with the recently adopted General WDRs or waivers of WDRs.

The Regional Water Board currently has resources to oversee timber sale activities associated with USFS lands pursuant to the USFS MAA. Regional Water Board staff continues to review USFS timber harvesting activities for compliance with the recently adopted Categorical Waiver of WDRs and implementation of best management practices. Review of non-timber nonpoint source activities on USFS land is not well funded. Regional Water Board staff is unable to implement this portion of the USFS MAA except for responding to complaint issues on a case-by-case basis. This is a significant issue for future oversight by the Regional Water Board for these activities.

Local Contracts/Agreements
The Regional Water Board will continue active involvement in the Clean Water Act sections 319(h) grant program and the Water Bond grant programs, as well as promoting other programs like the California Department of Fish and Game programs.

Water Quality Planning
The Basin Plan review process feeds into the activities to the extent issues were identified in the Triennial Review and applicable to the Big River watershed. The top priority issue is the review the Nonpoint Source Control Measures. In addition, the TMDL strategies will be incorporated into the Basin Plan at some future date.

Evaluation and feedback
The Regional Water Board will evaluate progress on a yearly basis, the TMDL providing the focus. Appendix B contains details on nonpoint source program activities and needs.

BUDGET

The Regional Water Board will attempt to fund the highest priority actions as identified in this watershed to the extent funding constraints allow, and will pursue additional funding to conduct outreach and enforcement activities as needed to pursue the actions currently not addressed.

Appendix 2.3.6-A
Stakeholders

Partial listing of agencies and groups with water quality jurisdiction and interests:

United States
Environmental Protection Agency
Fish and Wildlife Service
National Marine Fisheries Service
Natural Resources Conservation Service

California State
California Environmental Protection Agency
Department of Forestry and Fire Protection
Board of Forestry
Department of Fish and Game
Department of Health Services
Department of Toxic Substance Control
Department of Water Resources
California Coastal Conservancy
Jackson State Demonstration Forest
California State Parks, Mendocino Headlands State Park, Big River Unit
California State Parks, Montgomery Woods State Park

Mendocino County
Water Agency
Planning Department
Department of Environmental Health

Local Agencies
Mendocino County Resource Conservation District
city planning departments
city public works departments

Public Interest Groups and Industries
Coast Action Group
Pacific Coast Federation of Fishermen's Associations
Mendocino Redwood Company
Campbell Timberland Management
Pioneer Resources
Mendocino Land Trust
Trust for Wildland Communities
Friends of the Big River
Big River Watershed Alliance
Coastal Land Trust
Mendocino Coast Watch
Redwood Coast Land Conservancy
Redwood Community Action Agency